

CLAIMS

What is claimed is:

1 1. An echo/near-end-crosstalk cancellation system for a
2 bi-directional data communications system comprising:

3 a first finite impulse response (FIR) filter;

4 a second FIR filter coupled to the first FIR filter;

5 a data partitioning means for partitioning a data
6 signal, wherein a first portion of the partitioned data
7 signal is processed by the first FIR filter, and a second
8 portion of the partitioned data signal is processed by the
9 second FIR filter; and

10 a combination means for subtracting the outputs of the
11 first and second FIR filters from the data signal to provide
12 echo/near-end-crosstalk (E/N) cancellation.

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1 2. The system according to Claim 1, further
2 comprising a control means for adjusting the plurality of
3 filter output values.

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1 3. The system according to claim 1, wherein the first
2 FIR filter and the second FIR filter are each implemented as
3 a separate integrated circuit.

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1 4. The system according to claim 1, wherein the first
2 FIR filter is comprised of a plurality of filter elements.

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1 5. The system according to claim 1, wherein the
2 second FIR filter is comprised of a plurality of filter
3 elements.

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1 6. The system according to claim 1, wherein the data
2 partitioning means comprises a plurality of conductors for
3 conducting the first portion of the data signal to the first
4 FIR filter and the second portion of the data signal to the
5 second FIR filter.

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1 7. The system according to claim 6, wherein the first
2 portion of the partitioned data signal is comprised of the
3 least significant bits (LSBs) of the data signal and the
4 second portion is comprised of the most significant bits
5 (MSBs) of the data signal.

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1 8. The system according to claim 6, wherein the first
2 portion of the partitioned data signal negates a first
3 portion of an E/N signal generated as a result of the
4 transmission of the data signal.

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1 9. The system according to claim 8, wherein the
2 second portion of the partitioned data signal negates a
3 second portion of an E/N signal generated as a result of the
4 transmission of the data signal, wherein the second portion
5 of the E/N signal is not included in the first portion.

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1 10. The system according to claim 1, wherein the first
2 and second FIR filters are adaptive type filters.

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1 11. The system according to claim 1, wherein the first
2 and second FIR filters are non-adaptive type filters.

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1 12. The system according to claim 1, wherein the first
2 and second FIR filters are digital filters.

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1 13. The system according to claim 1, wherein both the
2 first and second FIR filters are configured identically in
3 direct form.

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1 14. The system according to claim 1, wherein both the
2 first and second FIR filters are configured identically in
3 transpose form.

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1 15. The system according to claim 1, wherein the first
2 and second FIR filters are configured differently, with one
3 being in direct form and the other being in transpose form.
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1 16. The system according to claim 1, wherein the
2 control means for adjusting the plurality of filter output
3 values comprises a multi-tap delay line including a
4 plurality of taps, wherein at least one programmable delay
5 line is interposed between two of the plurality of taps.
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1 17. The system according to claim 1, wherein the
2 control means for adjusting each of the plurality of filter
3 output values comprises at least one holding register in
4 each FIR filter for implementing a unique one of a plurality
5 of adaptive delays.
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1 18. The system according to claim 1, wherein the first
2 and second FIR filters filter the data signal using either
3 fixed or floating point numbers.
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1 19. A method for partitioning data words in an
2 echo/near-end-crosstalk cancellation circuit for a
3 communications system, comprising the steps of:

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1 22. A method for partitioning a data signal,
2 comprising the steps of:

3 determining from a plurality of echo/near-end-crosstalk
4 (E/N) signals a maximum bit resolution associated with a
5 single signal having a highest amplitude;

6 selecting a first FIR filter and a second FIR filter
7 each having a bit resolution equal to at least half of the
8 maximum bit resolution; and

9 partitioning the plurality of E/N signals such that a
10 first portion is processed by the first FIR filter, and a
11 second portion comprised of bits having a data size greater
12 than the bit width of the first FIR filter are processed by
13 the second FIR filter.

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